

2. § 103 Rejection

Claims 1-23 have been rejected under 35 U.S.C. § 103(a) as being obvious in view of Lebby et al (US 5,956,363) and Brillouet et al (US 6,052,398).

Brillouet et al disclose vertical-cavity surface-emitting lasers (VCSELs) that are formed on an InP substrate and which require that a bottom distributed Bragg reflector (DBR) mirror 18, 118, 218, 318, or 418 be formed from the indium phosphide/indium-gallium phosphide-arsenide (InP/InGaAsP) material system (see col. 4, lines 12-30; col. 9, lines 22-26; col. 11, lines 5-10, 36-41 and 56-61). Each VCSEL in Brillouet et al requires the use of a bottom DBR mirror that must be formed in the InP/InGaAsP material system. This is contrary to Lebby et al who teach against the use of InP/InGaAsP for the DBR mirrors:

When an InGaAs/InGaAsP active region is used, an InP/InGaAsP material system must be used for the mirror stacks in order to achieve a lattice match to the InP. In this system, however, it is practically impossible to achieve decent DBR based mirrors because of the insignificant difference in the refractive indices in this material system. (col. 1, lines 43-49)

Applicants respectfully submit that the requirement in Brillouet et al for a bottom DBR mirror formed in the InP/InGaAsP material system and the teaching in Lebby et al against the use of the InP/InGaAsP material system to form such a DBR mirror results in a nullity and provides evidence for the *prima facie* unobviousness of this combination set forth by the Office. One skilled in the art would simply not be motivated to combine Brillouet et al with Lebby et al to form Applicants' claimed invention given the contrary requirements for the bottom DBR mirror in these two references. Therefore, Applicants' Claims 1-23 must be allowable.

Furthermore, Applicants respectfully submit that the Office has not shown the required motivation for one skilled in the art to combine the teachings of Lebby et al with Brillouet et al to form Applicants' claimed invention. As stated above, the contrary requirements of these two references with respect to the bottom DBR mirror provides evidence that one skilled in the art would not be motivated to combine these two references.

PATENT

Serial No.: 09/ 871,492

Group No.: 2815

Page 3

Additionally, Lebby et al require that the two DBR mirrors be oppositely doped:

However, it should be understood that while on[e] of stacks 14 and 26 of distributed Bragg reflectors will be selected as being p-type doped, the other stack 26 and 14 will be n-type doped." (col. 5, lines 3-6)

while Brillouet et al teach to the contrary that both DBR mirrors must be doped with the same n-type doping:

The indications given above concerning light absorption show that in the context of presently known techniques it is preferable for the doping of the mirrors of a surface emitting laser to be N type when both of the mirrors are Bragg mirrors made of semiconductor layers. (col. 3, lines 18-22)

These contrary requirements regarding doping of the DBR mirrors provides further evidence that one skilled in the art would not be motivated to combine these two references set forth by the Office. Therefore, Applicants respectfully submit that the Office has not made a valid *prima facie* case of obviousness for the rejection of Applicants' Claims 1-23 based on the combination of Lebby et al and Brillouet et al.

3. Supplemental Information Disclosure Statement

Applicants submit herewith a Supplemental Information Disclosure Statement including references from an International Search Report.

As payment for submission of the Supplemental Information Disclosure Statement, the Office is authorized to charge Sandia Corporation Deposit Account No. **19-0131** in the amount of **\$180.00** (37 CFR 1.17(p)).

Should the Office determine that additional fees are due, the Office is hereby authorized to charge such additional fees to Sandia Corporation Deposit Account No. **19-0131**

A duplicate of this transmittal is enclosed.

PATENT

Serial No.: 09/ 871,492

Group No.: 2815

Page 4

Conclusion


Applicants have responded to each and every rejection and objection, and urge that the Application is in condition for allowance. A favorable reconsideration and entry of the amendments presented herein is earnestly solicited.

Respectfully submitted,

Dated: February 27, 2003

Phone: (505) 844-4007

FAX: (505) 844-1418


John P. Hohimer
Patent Attorney, Reg. No. 39,226
Sandia National Laboratories
Patent & Licensing Center, MS 0161
P. O. Box 5800
Albuquerque, New Mexico 87185-0161

CERTIFICATE OF MAILING

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited on the date shown below with the United States Postal Service in an envelope addressed to the Assistant Commissioner for Patents, Washington, D. C. 20231.

☐ 37 CFR 1.8(a)

With sufficient postage as first class mail
Addressee"

OR

☒ 37 CFR 1.10

As "Express Mail Post Office to

Mailing Label No. E202658850045

MARY LOUKOTA
(Type or print name of person mailing paper)

Dated: 3/3/03

